

United States
Environmental Protection
Agency

Pesticides And
Toxic Substances
(H-7503W)

July 1991



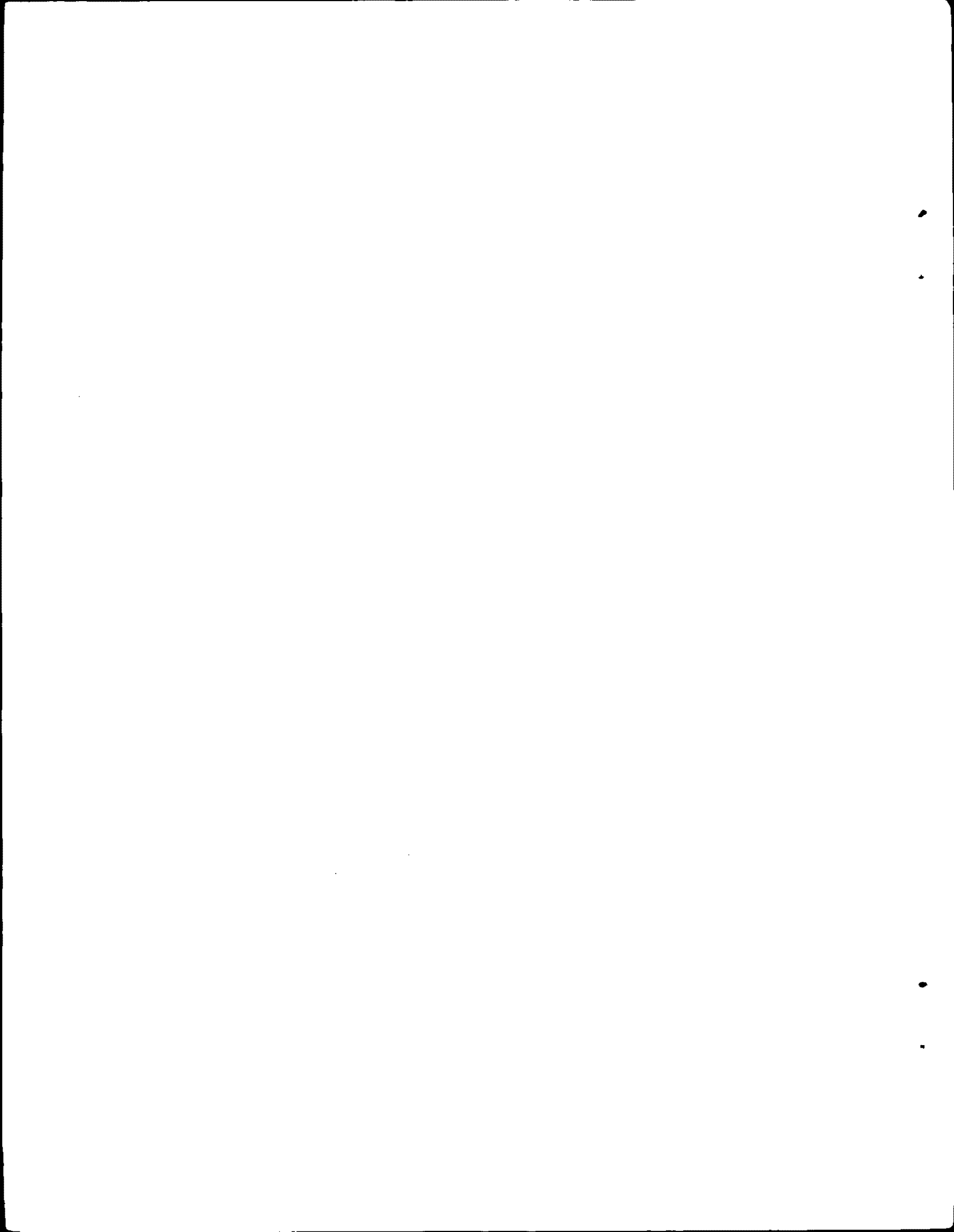
Pesticides Industry Sales And Usage

1989 Market Estimates

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PESTICIDE INDUSTRY SALES AND USAGE:

1989 MARKET ESTIMATES

by

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INTRODUCTION

This report provides an overview of the pesticide industry for 1989. It contains a series of tables with estimates of U.S. and world pesticide markets for 1989. The tables contain information on quantities used and user expenditures (by economic sector and pesticide class), imports, exports, numbers of firms/individuals involved in production/use of pesticides, number of pesticides, certified applicators and on a number of other topics. Most of the tabular information is for the year 1989, but some historical data are also presented. Graphic versions of the data are along with a number of the tables. The following page presents a number of highlights of this year's report and page 3 is a listing of the tables in the report.

OVERVIEW

Pesticide usage in the U.S. has been relatively stable at about 1.1 billion pounds of active ingredient during recent years. The agricultural share of pesticide usage (see Table 9) appears to have stabilized at about three fourths of the total after increasing steadily throughout the 1960's and 1970's, primarily due to the expanded use of herbicides in crop production. Growth in the use of pesticides during the 1980's was slowed by: lower application rates due to the introduction of more potent pesticides, more efficient use of pesticides, and lower farm commodity prices.

The volume of pesticides used for non-agricultural purposes in the U.S. has been quite stable in recent years at about 275 million pounds of active ingredient. This equals about 1.1 lb. per capita in the U.S. (average for 250 million people). Considering all usage, including agriculture, U.S. pesticide usage equals somewhat more than 4 pounds per capita (4.28 lbs in 1989).

The Office of Pesticide Programs, EPA, is nearing completion of a national survey of home and garden usage of pesticides. The survey field enumeration was conducted in late 1990 and the results will be available from this office later in calendar year 1991.

If you have questions regarding this report or need further information, please contact Arnold Aspelin, Chief of the Economic Analysis Branch, at (703) 308-8136.

HIGHLIGHTS OF REPORT

(table no. in parenthesis)

- * U.S. pesticide user purchases account for one-third of the world market (1).
- * Annual U.S. pesticide user expenditures totalled approximately \$7.6 billion in 1989 (2).
- * Agriculture accounts for over two-thirds of pesticide user expenditures and three-fourths of the quantity used annually (2 & 3).
- * Herbicides are the leading type of pesticides, in terms of both user expenditures and volumes used (2 & 3).
- * About 1.1 billion pounds active ingredient of conventional pesticides are used annually in the U.S. (4). This usage involves about 21,000 pesticide products registered under the Federal Pesticide Law.
- * Total U.S. pesticide usage in 1989 was about 2.1 billion pounds of active ingredient. (This figure includes wood preservatives, disinfectants, and sulfur.) (4)
- * Farmers' expenditures on pesticides equal about 4% of total farm production expenditures (5).
- * Total pesticide R & D expenditures represent roughly 13% of pesticide expenditures by user community (6).
- * Net usage of pesticides of about 1.1 billion pounds derives from U.S. production of 1.3 billion, imports of 0.2 billion, and exports of 0.4 billion (pounds of active ingredient of conventional pesticides) (7).
- * Significant numbers of firms/individuals are involved in the production/distribution of pesticides as follows:
 - - 120 leading producers
 - - 6,200 production sites
 - - 3,000 formulators
 - - 17,000 distributors (8).
- * The usage of pesticides occurs at more than 900,000 farms and at least 70 million households. (8).
- * The two most widely used pesticides by volume are the herbicides atrazine and alachlor (10).
- * There were 15 new active ingredients registered as pesticides under FIFRA in calendar year 1989 (11).
- * There are nearly 1.3 million certified pesticide applicators in the U.S. (12). Of these, most are for agricultural applications (nearly 1.0 million) and the remainder (0.3 million) are certified commercial applicators (12).

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TABLE 1: U.S. and World Conventional Pesticide Sales at User Level, 1989 Estimates.

Pesticide Class	U.S. Market		World Market		U.S. % of World Mkt
	(Million)	(%)	(Million)	(%)	
----- User Expenditures (millions of \$'s) -----					
Herbicides	\$3,980	52%	\$10,350	45%	38%
Insecticides	2,299	30%	6,900	30%	33%
Fungicides	798	11%	4,370	19%	18%
Other	538	7%	1,380	6%	39%
Total	7,615	100%	23,000	100%	33%
-- Vol. of Active Ingredient (millions of lbs.) --					
Herbicides	655	61%	1,837	46%	36%
Insecticides	226	21%	1,405	35%	16%
Fungicides	111	10%	541	14%	21%
Other	78	7%	216	5%	36%
Total	1,070	100%	4,000	100%	29%

Note: Totals may not add due to rounding.

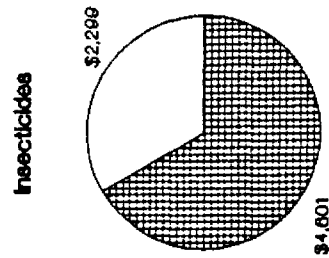
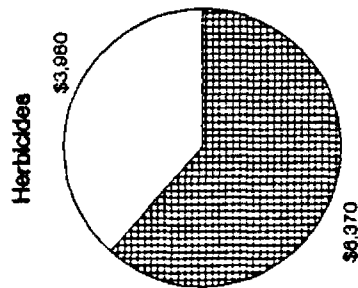
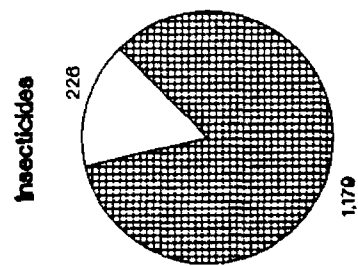
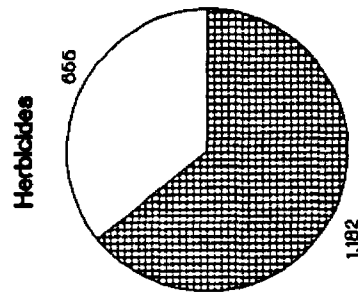
Source: EPA estimates based on NACA annual surveys and other sources.

Quantities and Sales of Pesticides in the U.S. and the Rest of the World

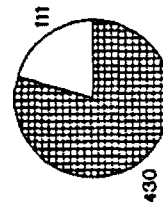
Sizes of pie charts show relative sizes of markets (U.S. share is shown in white)

Quantities

Sales



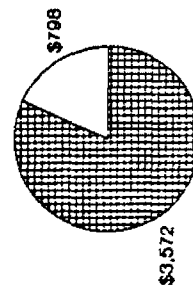
Fungicides



Other Pesticides



Fungicides



Other Pesticides

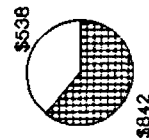


TABLE 2: User Expenditures for Conventional Pesticides in the U.S. by Class and Sector, 1989 Estimates.

	<u>Herbicides¹</u>		<u>Insecticides²</u>		<u>Fungicides³</u>		<u>Other⁴</u>		<u>Total</u>	
	(mil \$)	(%)	(mil \$)	(%)	(mil \$)	(%)	(mil \$)	(%)	(mil \$)	(%)
Agriculture	3,255	82%	1,099	48%	683	86%	388	72%	5,425	71%
Ind/Com/Govt	525	13%	400	17%	100	13%	50	9%	1,075	14%
Home & Garden	200	5%	800	35%	15	2%	100	19%	1,115	15%
Total	3,980	100%	2,299	100%	798	100%	538	100%	7,615	100%

Source: EPA staff estimates based on NACA annual surveys and other sources.

¹ Includes plant growth regulators.

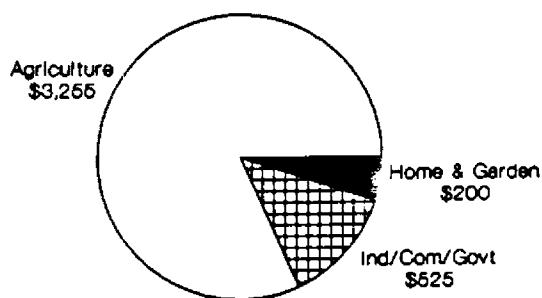
² Includes miticides and contact nematicides.

³ Does not include wood preservatives.

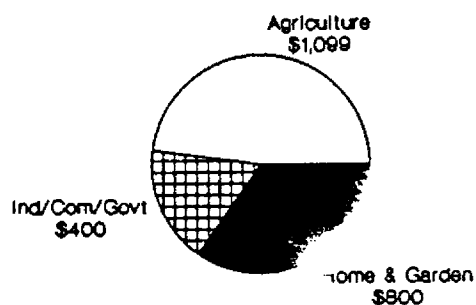
⁴ Includes rodenticides, fumigants, and molluscicides, but does not include wood preservatives, disinfectants, and sulfur.

User Expenditures for Pesticides in the U.S. by Class and Sector
Size of pie charts show relative size of markets
(Amounts shown in Millions of Dollars)

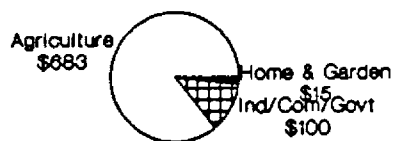
Herbicides



Insecticides



Fungicides



Other Pesticides

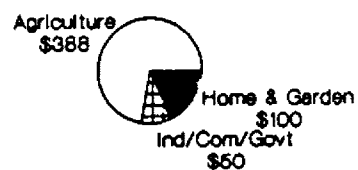


TABLE 3: Volume of Conventional Pesticide Active Ingredient Used in U.S. by Class and Sector, 1989 Estimates.

	<u>Herbicides¹</u>		<u>Insecticides²</u>		<u>Fungicides³</u>		<u>Other⁴</u>		<u>Total</u>	
	(mil \$)	(%)	(mil \$)	(%)	(mil \$)	(%)	(mil \$)	(%)	(mil \$)	(%)
Agriculture	520	79%	151	67%	65	59%	70	90%	806	75%
Ind/Com/Govt	110	17%	45	20%	35	32%	5	6%	195	18%
Home & Garden	25	4%	30	13%	11	10%	3	4%	69	6%
Total	655	100%	226	100%	111	100%	78	100%	1,070	100%

Source: EPA staff estimates based on NACA annual surveys and other sources.

¹ Includes plant growth regulators.

² Includes miticides and contact nematicides.

³ Does not include wood preservatives.

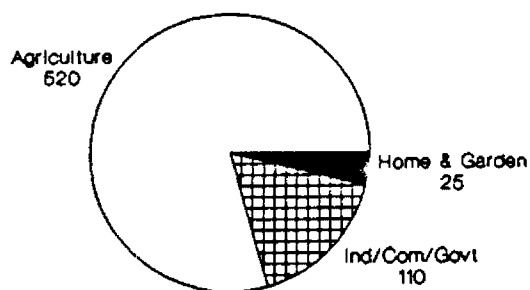
⁴ Includes rodenticides, fumigants, and molluscicides, but does not include wood preservatives, disinfectants, and sulfur.

Volume of Conventional Pesticide Active Ingredients Used in the U.S. by Class and Sector

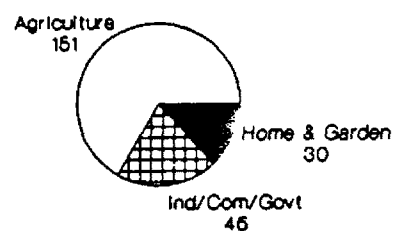
Quantities in Millions of Pounds

Sizes of pie charts show relative sizes of markets

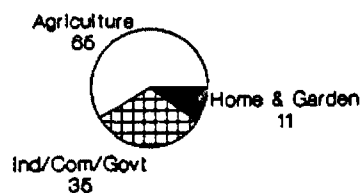
Herbicides



Insecticides



Fungicides



Other Pesticides



TABLE 4: U.S. Usage of Conventional Pesticides and Other Types,
1989 Estimates.

Type	Billion Pounds A.I.
Conventional Pesticides	1.07
Wood Preservatives	0.70
Disinfectants ¹	0.25
Sulfur	0.04
Total	2.06

Source: EPA staff estimates.

¹ This estimate includes only disinfectants and not other antimicrobials.

TOTAL 1989 U.S. PESTICIDE USAGE CONVENTIONAL PESTICIDES AND ALL OTHERS

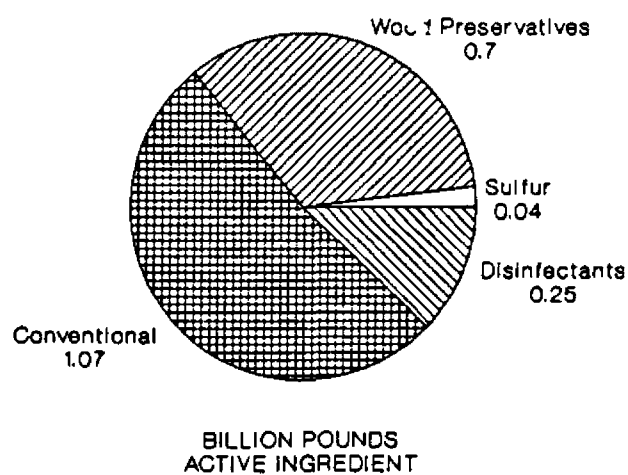


TABLE 5: Importance of Conventional Pesticide Expenditures to U.S. Farmers, 1989 Estimates.

	(\$ Billion)	(Percent)
Farm Pesticide Expenditures ¹	5.4	4.4
Total Farm Production Expenditures ²	124.0	100.0

¹ Excludes wood preservatives, disinfectants, and sulfur.

² USDA, 1991.

Source: USDA and EPA staff estimates.

TABLE 6: Comparison and Cost of R&D Expenditures to meet EPA Data Requirements Relative to Total Conventional Pesticide R&D Expenditures in U.S., 1989 Estimates.

	\$ Million	Percent
Pesticide User Expenditures	7,615	100.0
Total Pesticides R&D Expenditures ¹	966	12.7
EPA Registration-Related R&D Expenditures ¹	242	3.2

Source: EPA staff estimates, based on the NACA survey (1989), and other sources.

¹ Re-estimated for 1989 based on data from NACA member firms only. Total R&D expenditures for U.S. market are global R&D expenditures of NACA firms reduced by 29.2 percent, the share of sales abroad. EPA registration-related expenditures are estimated to be 25 percent of total R&D expenditures, based upon NACA data for 1987, the latest year with such a break-out in the NACA annual survey report.

TABLE 7: U.S. Production and Net Supply, Conventional Pesticides Producer at Level, 1989 Estimates.

Category	Active Ingredient (lbs.)	Sales Value
----- Billions -----		
U.S. Production	1.3	\$7.5
U.S. Imports	<u>0.2</u>	<u>1.5</u>
Total Supply	1.5	9.0
U.S. Exports	0.4	2.3
Net Supply/Usage	1.1	6.7

Sources: EPA staff estimates based on NACA Surveys, Department of Commerce Publications, and other sources.

TABLE 8: U.S. Pesticide Production, Marketing and User Sectors
Profile of Numbers of Units Involved, 1989.
(Approximate Values)

Production and Distribution			
Basic Production		Distribution and Marketing	
1. Major Basic Producers	20	1. Formulators	
2. Other Producers	100	- major national	150-200
3. Producing Sites	6,200	- other	2,500-2,800
4. Active Ingredients Registered	784	2. Distributors & Establishments	
5. Active Ingredients with food/feed tolerances	350	- major national	250-350
6. New Active Ingredients/Year	15	- other	16,500
7. Total Employment	10,000	3. Formulated Products Registered at Federal Level	21,000
User Level			
Agricultural Sector		Ind./Comm. Gov't Sector	
1. Land in Farms	991 mil. acres	1. No. Comm. Pest Control Firms	40,000
2. Harvested	289 mil. acres	2. No. Certified Applicators	303,000
3. Total No. Farms	2.1 mil.		
4. No. Farms Using Chemicals for:			
- insects on hay/crops	554,000		
- nematodes	66,000		
- diseases on crops/orchards	129,000		
- weed/grass/bush	913,000		
- defoliation/fruit thinning	75,000		
(above are '87 census no's.)			
5. Number Private Pesticide Applicators Registered	962,000		
		Home/Garden Sector	
		1. Total U. S. Households	94 mil.
		2. No. Households Using-('90)	
		- Insecticides	70 mil.
		- Antimicrobials	46 mil.
		- Plant treatments	19 mil.
		- Animal treatments	15 mil.

Source: EPA Staff Estimates

TABLE 9: Annual Usage Estimates of the Largest Volume Pesticides in U.S. ¹ (approximate values, 1989)

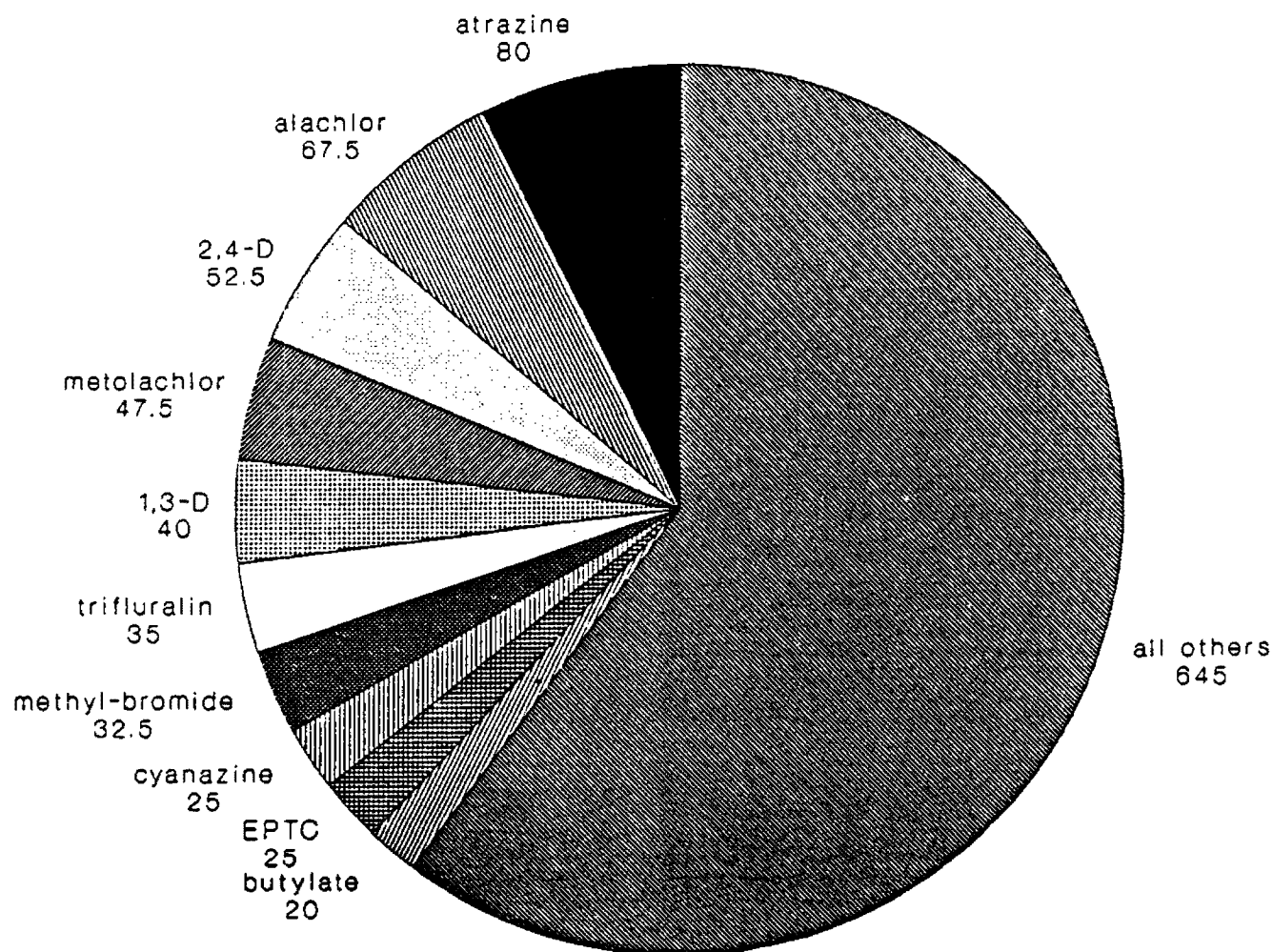
Pesticide	Usage in Million Pounds Active Ingredient
Atrazine	70 - 90
Alachlor	60 - 75
2,4-D	40 - 65
Metolachlor	40 - 55
1,3-D	35 - 45
Trifluralin	30 - 40
Methyl-bromide	25 - 40
Cyanazine	20 - 30
EPTC	20 - 30
Butylate	15 - 25
Bentazon	10 - 15
Carboaryl	10 - 15
Terbufos	9 - 11
Chlorpyrifos	8 - 16
Glyphosate	8 - 13
Maneb/Mancozeb	8 - 12
Methyl Parathion ²	8 - 12

Source: EPA staff estimates based on a variety of sources.

¹ The estimates represent all usage of the active ingredient including noncrop usage. The estimates do not include 30-40 mil/lbs Oil.

² The estimate does not include ethyl parathion usage.

CONVENTIONAL PESTICIDE USAGE, 1989: LEADING PESTICIDES AND ALL OTHERS



Source: EPA/OPP/BEAD Estimates
Total For 10 Largest = 425 mil lb.
Total Usage = 1070 million lbs.

TABLE 10: United States Conventional Pesticide Usage, Total and Estimated Agricultural Sector Share, 1964-1989

Year	Total U.S.	Agricultural Sector	Agricultural Sector
	-----Million Lbs. AI-----	Share	--Percent--
1964	540	320	59
1965	610	335	55
1966	680	350	51
1967	735	380	52
1968	835	470	56
1969	775	430	55
1970	740	430	58
1971	835	495	59
1972	875	525	60
1973	910	560	62
1974	950	590	62
1975	990	625	63
1976	1,030	660	64
1977	1,075	720	67
1978	1,110	780	70
1979	1,150	840	73
1980	1,175	846	72
1981	1,205	860	71
1982	1,100	880	80
1983	953	733	77
1984	1,080	850	79
1985	1,112	861	77
1986	1,096	820	75
1987	1,085	815	75
1988	1,130	845	75
1989	1,070	806	75

Note: Excludes wood preservatives, disinfectants, and sulfur.
Source: EPA staff estimates.

CONVENTIONAL U.S. PESTICIDE USAGE TOTAL VS. AGRICULTURAL SECTOR

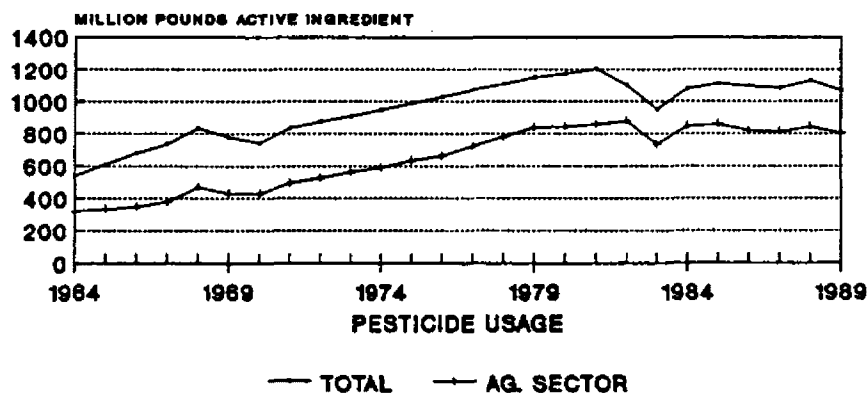


TABLE 11: Number of Chemicals Registered for First Time as Pesticides Under FIFRA, by Type,
Calendar Years 1967-1989*

Year	Type							Total Uses Registered	Total Chemicals Registered
	Insecticide	Herbicide	Fungicide	Bactericide/ Slimicide	Nematicide	Rodenticide	Other		
1967	4	2	2	5	0	2	1	16	16
1968	6	2	5	4	0	0	1	18	18
1969	7	4	0	2	0	0	1	14	14
1970	1	2	2	3	0	0	2	10	10
1971	0	1	1	1	0	1	1	5	4
1972	4	5	6	5	0	0	1	21	17
1973	5	3	4	2	1	0	0	15	13
1974	6	8	6	0	1	1	0	22	22
1975	8	11	5	11	0	0	1	36	35
1976	2	3	2	4	0	0	1	12	12
1977	1	1	0	1	0	0	0	3	3
1978	2	2	0	0	0	0	1	5	5
1979	8	2	4	0	0	1	2	17	17
1980	4	3	1	0	0	2	1	11	11
1981	4	3	2	1	0	0	6	16	16
1982	5	5	1	1	0	2	3	17	17
1983	5	5	3	1	0	0	0	14	14
1984	6	1	2	2	0	1	2	14	13
1985	8	1	1	1	0	0	2	13	10
1986	2	7	0	0	1	0	2	12	11
1987	3	5	0	1	1	0	2	12	11
1988	2	5	1	0	1	0	2	11	11
1989	5	5	3	0	0	0	2	15	15

Source: EPA registration files.

TOTAL NEW CHEMICAL REGISTRATIONS, FIRST-TIME REGISTRATIONS, 1967-1989.

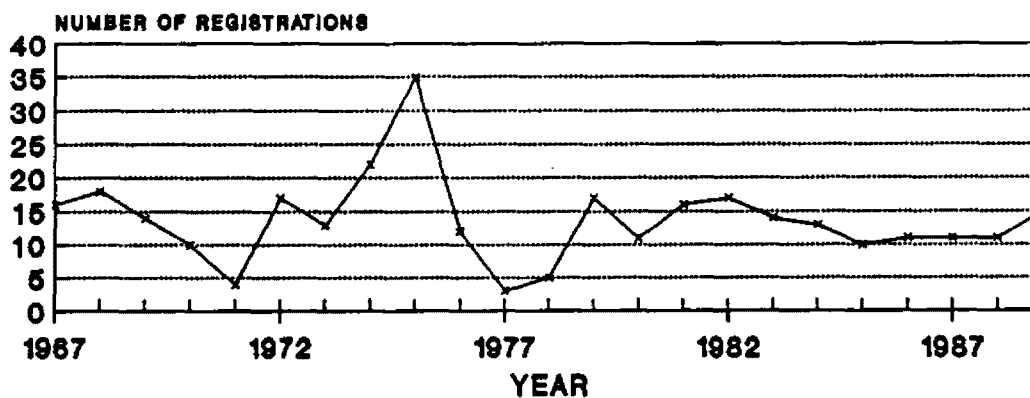


TABLE 12: Number of Certified Applicators in the United States, 1989 Estimates¹.

EPA Region	Private ²	Commercial ³
1	7,869	9,025
2	25,824	32,063
3	47,690	22,581
4	225,370	46,925
5	156,925	41,977
6	215,746	29,391
7	140,870	27,418
8	70,510	46,774
9	32,389	20,888
10	39,284	26,092
U. S. ⁴	962,477	303,134

Source: EPA 5700-33H form that states submit to EPA regions each year.

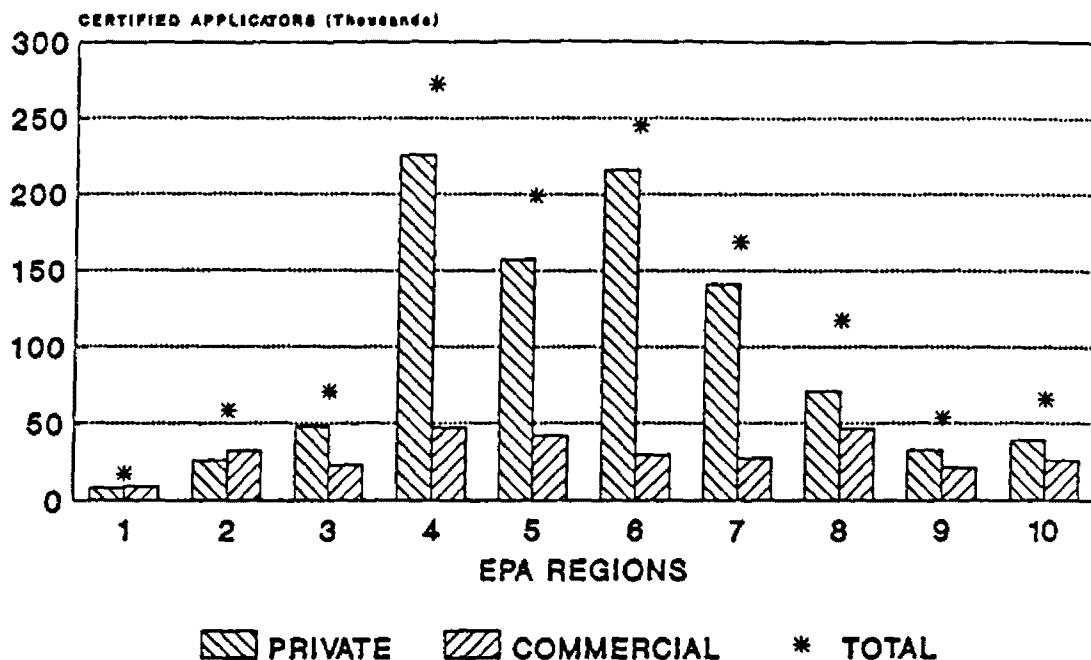
¹ The following page presents a map of EPA regions.

² The term "private applicators" refers primarily to individual farmers.

³ Commercial refers to professional pesticide applicators.

⁴ The U.S. totals do not add because some applicators are certified in more than Region.

CERTIFIED PESTICIDE APPLICATORS ESTIMATED 1989 TOTAL, BY EPA REGION



Source: EPA/OPP/BEAD Estimate
 Total Private = 962,477
 Total Commercial = 303,134

EPA REGIONAL OFFICES

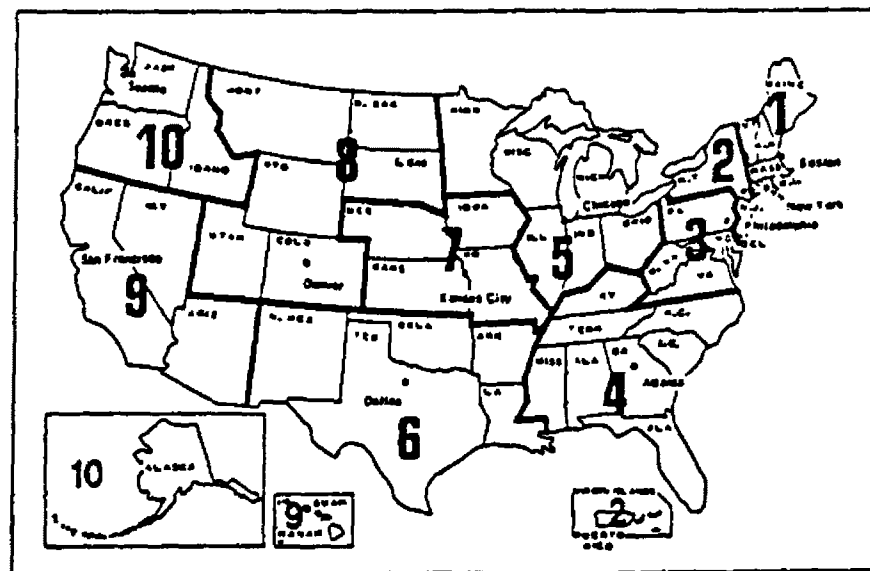


TABLE 13: U.S. Annual Volume of Pesticide Usage, by Type, 1979-1989.

Pesticide Type	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
Millions of Lbs. A.I.											
Herbicides	560	555	570	544	575	675	670	655	645	660	655
Insecticides	378	395	405	391	255	270	300	295	260	268	226
Fungicides	106	120	123	119	68	80	82	86	122	132	111
Other	106	105	107	106	55	55	60	60	60	70	78
Total	1,150	1,175	1,205	1,160	953	1,080	1,112	1,096	1,087	1,130	1,070

Source: EPA/OPP/BEAD estimates.

ANNUAL U.S. VOLUME OF PESTICIDE USAGE ALL PESTICIDES, BY TYPE, 1979-1989.

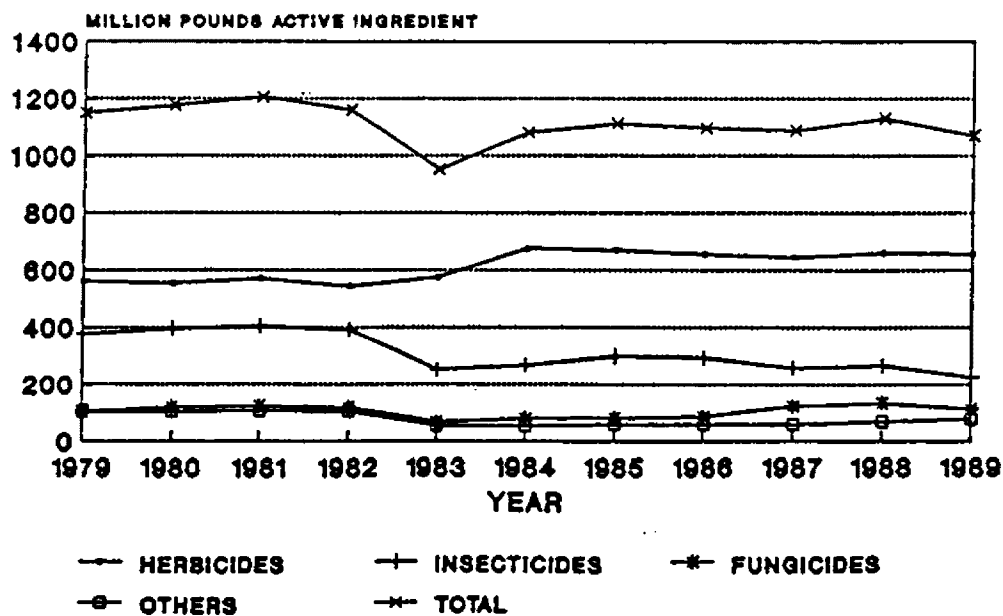
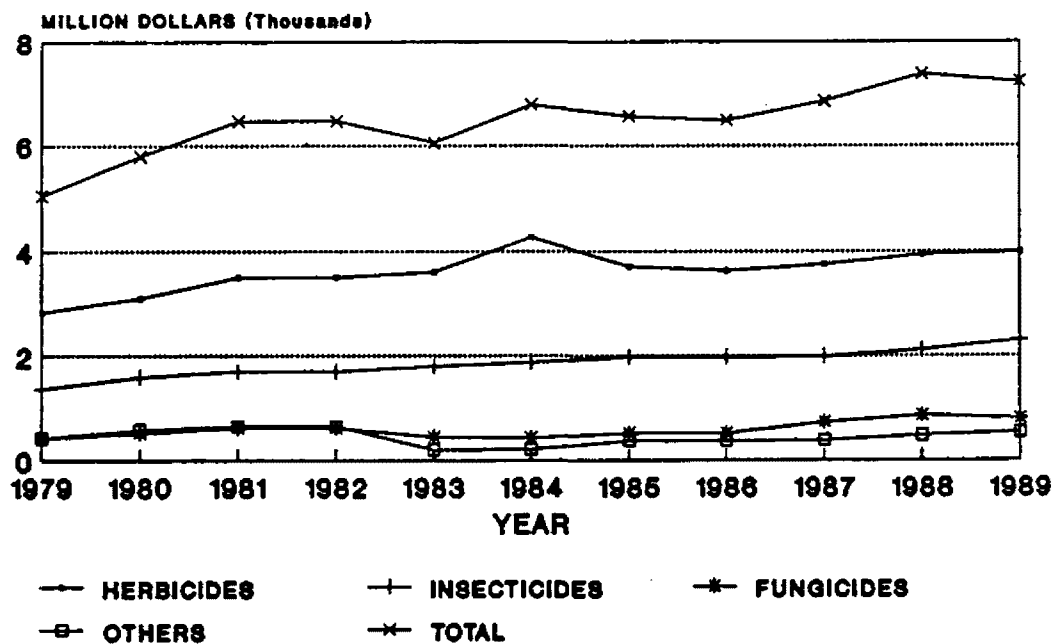


TABLE 14: U.S. Annual User Expenditures on Pesticides, by Type, 1979-1989.

Pesticide Type	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
-----Millions of \$-----											
Herbicides	\$2,830	\$3,100	\$3,500	\$3,500	\$3,600	\$4,260	\$3,700	\$3,625	\$3,745	\$3,930	\$3,980
Insecticides	1,370	1,600	1,700	1,700	1,800	1,880	1,975	1,980	1,990	2,110	2,299
Fungicides	425	520	620	620	450	428	515	515	730	860	798
Other	425	580	650	650	200	215	370	370	385	480	538
Total	5,050	5,800	6,470	6,470	6,050	6,783	6,560	6,490	6,850	7,380	7,615

Source: EPA/OPP/BEAD estimates.

ANNUAL USER EXPENDITURES ON PESTICIDES TOTAL U.S. EXPENDITURES, BY TYPE 1979-89



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